

# Editorial

## The race of chasing the diseased parathyroid gland still continues....

In spite of all clinical, biochemical and imaging information available to us, we still are never 100% sure that there is single-gland involvement or multiple parathyroid glands are involved in patients with primary hyperparathyroidism (PHPT). The missed parathyroid glands trouble the clinicians equally as they trouble the patients with persistence/recurrence of the problems. We continue to improve our prediction methodologies to have the best possible accuracy rates in order to plan focused parathyroidectomy (FP) or bilateral neck exploration. Recently, 4D CT scans and Wisconsin index have been added to help us do the appropriate patient selection for FP.<sup>1,2</sup> In the armamentarium of all gadgets we have intraoperative parathyroid hormone (IOPTH) levels (fall of > 50%) to document cure rates of the surgery and to know when all the hyperfunctioning parathyroid glands have been removed and to stop further neck exploration.<sup>3</sup>



In 2006, Kebebew et al<sup>4</sup> designed a novel scoring system named as CaPTHUS scoring for predicting single-gland versus multiple gland disease in PHPT. This scoring system is based on total Calcium (>3 mmol/L or >12 mg/dL), intact parathyroid hormone level (>2 times the upper limit of normal), positive ultrasound and sestamibi scan results for single enlarged gland, and concordant imaging findings. Patients with score >3 can safely undergo focused parathyroidectomy and those with score <3 need further tests to rule out multiple glands involvement.

In the current issue of this journal, James et al conducted a study on application of the CaPTHUS scoring system on patients from UK. It was done on 324 patients with PHPT who underwent surgery with IOPTH monitoring. The authors inferred that this scoring system makes the surgeon more confident for doing FP when score is >3 but needs to be validated in each center prior to using it as a routine as the results may vary depending on the disease presentation, gland weight and other factors.

With this new scoring method, few concerns need to be addressed. Firstly, whether is it adding to the required/missing information and secondly can we avoid use of IOPTH test? In patients with mild PHPT, there are studies showing that such patients have more often multi-gland disease and negative imaging.<sup>5</sup> Will this new scoring system help in such patients? Elfenbein et al<sup>6</sup> from University of Wisconsin conducted a study and tried answering the second question. In their study, they noted that in patients with high CaPTHUS scores, atleast 10% of the patients had multi-gland disease and IOPTH use is complimentary to the scoring system and cannot be avoided to aim better cure rates. The cure rates with IOPTH was 98% but dropped to 89% without IOPTH use. Mogollón-González et al<sup>7</sup> have applied CaPTHUS score in their European population and found that it is useful to help select patients but other adjuncts are also needed and cannot be avoided.

Hence, CaPTHUS scoring system is a new kid on the block of differentiating single-gland disease from multi-gland disease but cannot be used as a standalone test. We have to consider all the clinical, biochemical, and radiological parameters for the best possible prediction rate for single-gland disease and ruling out multi-gland disease. With CaPTHUS scores > 3 if we can avoid using IOPTH then it may add to cost effectiveness also along with increasing the accuracy rates. We may help more than 90% of our patients but we have to accept 5-10% errors where hidden multi-gland disease will keep surprising us and motivating us to pursue our battle for finding the ideal methodology still so the race of chasing the diseased parathyroid gland still continues.

## References

1. Lubitz CC, Hunter GJ, Hamberg LM, Parangi S, Ruan D, Gawande A, Gaz RD, Randolph GW, Moore FD Jr, Hodin RA, et al. Accuracy of 4-dimensional computed tomography in poorly localized patients with primary hyperparathyroidism. *Surgery* 2010 Dec;148(6):1129-1137.
2. Mazeh H, Chen H, Levenson G, Sippel RS. Creation of a "Wisconsin index" nomogram to predict the likelihood of additional hyperfunctioning parathyroid glands during parathyroidectomy. *Ann Surg* 2013 Jan;257(1):138-141.

3. Bobanga ID, McHenry CR. Is intraoperative parathyroid hormone monitoring necessary for primary hyperparathyroidism with concordant preoperative imaging? *Am J Surg* 2017 Mar; 213(3):484-488.
4. Kebebew E, Hwang J, Reiff E, Duh QY, Clark OH. Predictors of single-gland vs Multi-gland parathyroid disease in primary hyperparathyroidism: a simple and accurate scoring model. *Arch Surg* 2006 Aug;141(8):777-782.
5. Schneider DF, Burke JF, Ojomo KA, Clark N, Mazeh H, Sippel RS, Chen H. Multi-gland disease and slower decline in intraoperative PTH characterize mild primary hyperparathyroidism. *Ann Surg Oncol* 2013 Dec;20(13):4205-4211.
6. Elfenbein DM, Weber S, Schneider DF, Sippel RS, Chen H. CaPTHUS scoring model in primary hyperparathyroidism: can it eliminate the need for ioPTH testing? *Ann Surg Oncol* 2015 Apr;22(4):1191-1205.
7. Mogollón-González M, Notario-Fernández P, Dominguez-Bastante M, Molina-Raya A, Serradilla-Martín M, Muñoz-Pérez N, Arcelus-Martínez JL, Villar-Del-Moral J, Jiménez-Ríos JA. The CaPTHUS score as predictor of multiglandular primary hyperparathyroidism in a European population. *Langenbecks Arch Surg* 2016 Nov;401(7):937-942.

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